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GREAT LAKES 2001

A PLAN FOR THE NEW MILLENNIUM

SPRING 2001

***A STRATEGIC PLAN FOR THE GREAT LAKES ECOSYSTEM - OUR ENVIRONMENTAL
GOALS AND HOW WE PLAN TO ACHIEVE THEM***

“Our Legacy, Our Future”

FOR PUBLIC CONSULTATION

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GREAT LAKES 2001 -A PLAN FOR THE NEW MILLENNIUM
*A Strategic Plan for the Great Lakes- Our Environmental Goals and
How We Plan to Achieve Them*

Partners:

U.S. Army Corps of Engineers - U.S. Environmental Protection Agency- U.S. Coast Guard
U.S. Department of Agriculture - National Oceanographic and Atmospheric Administration
U.S. Fish and Wildlife Service - U. S. Geological Survey
Agency for Toxic Substances and Disease Registry - U.S. Forest Service
Great Lakes Fishery Commission
Illinois Indiana Michigan Minnesota New York Ohio Pennsylvania Wisconsin
Great Lakes Tribal Governments

RENEWING THE PARTNERSHIP

Since the signing of the 1972 Great Lakes Water Quality Agreement (GLWQA or “the Agreement”), programs and policies to restore and protect the Great Lakes Ecosystem have served as a world-wide model for cooperative environmental protection and natural resource management. There have been many successes, and the ecosystem is in recovery. For example, excess nutrient loads which choked the Great Lakes with nuisance algae have been successfully addressed. New ways of doing business such as pioneering multi-media programs to prevent toxic pollution have been initiated and have become national models. Basin-wide efforts have been initiated to protect critical habitats which support the unique plants, fish and other aquatic life, and wildlife found in this freshwater ecosystem. While many efforts are underway, much work remains to be done.

With this Strategy, the Federal Government, the States, Tribes and other key partners responsible for environmental protection and natural resource management commit to achieving specific environmental goals through a full range of coordinated activities. The restoration and protection of the Great Lakes ecosystem continues to be a massive undertaking. The basin of this international watershed includes two nations, eight U.S. states, a Canadian Province, over forty Tribes and First Nations¹, and many local governments. Only through a cooperative partnership can we ensure the health of the Great Lakes.

To fulfill our domestic responsibilities, the Federal, State, and Tribal Agencies which comprise the United States Great Lakes Program will support the goals and actions described in this strategic plan. We will address the major threats to the Great Lakes -- including: toxic contamination, habitat degradation, fish advisories, invasive species, and beach closings -- by coordinating and enhancing our environmental protection and natural resource management efforts.

The Great Lakes basin is home to over thirty million people. It is where many of us live, work, and play. Through this strategy, the federal, state, and tribal agencies renew our efforts to improve both the health of the ecosystem and our ability to swim, fish, and drink the waters of the Great Lakes. Our work will be closely coordinated with our partners in environmental organizations, public groups, educational institutions, and industry.

¹ Canada refers to communities of Native Americans as “First Nations”.

WHY THE GREAT LAKES ARE IMPORTANT NATIONALLY AND GLOBALLY

The Great Lakes are the largest system of surface freshwater on the Earth, containing roughly 20% of the world's supply (5,500 *cubic miles* or about 6 *quadrillion gallons* of water). The water in the Great Lakes accounts for 95% of all the surface freshwater in the United States. In the U.S., the Great Lakes are considered a fourth seacoast. The total shoreline (U.S. and Canadian, including connecting channels and islands) is over 10,000 miles, or about 40% of the earth's circumference.

The Great Lakes basin holds major urban/suburban areas that are home to more than one-tenth of the U.S. population of the United States, and one-quarter of the population of Canada (a total of over 33 million people). Over 30 million people in the U.S. and in Canada rely on the Great Lakes as a source of drinking water.

The basin contains many thriving, ecologically rich areas. The Great Lakes ecosystem includes such diverse elements as northern evergreen forests, deciduous forests, tall grass and lake plain prairies, sandy barrens, alvars, dunes, and coastal wetlands. Over thirty of the basin's biological communities -- and over 100 species -- are globally rare or found only in the Great Lakes basin. The wealth of natural resources has long made the region a heartland of both the Canadian and U.S. industrial economy.

The economic activity exceeds \$200 billion a year. There are notable concentrations of steel, pulp/paper, and manufacturing facilities. The region generates more than 50 percent of the total U.S. manufacturing output. About one-third of the Great Lakes basin's land is in agricultural use. The eight Great Lakes states account for 30% of nationwide agricultural sales, a \$45 billion industry. [New data from NRCS will be available for the Great Lakes basin component later this year.] The international shipping trade annually transports 50 million tonnes of cargo. Main commodities are grain, iron ore, coal, coke, and petroleum products. Almost 50% of this cargo travels to and from overseas ports, especially Europe, the Middle East, and Africa.

Recreation is also an important part of the economy. The annual value of the commercial and sport fishery is estimated at over \$4.5 billion dollars. The eight Great Lakes states have about 3.7 million registered recreational boats, or about a third of the nation's total. The six hundred and thirty-seven state parks in the region accommodate more than 250 million visitors each year. It has been estimated that nearly 5.5 million hunters spend more than \$2.6 billion annually. A well-defined "four seasons" climate supports many other types of recreation.

The economic well-being of the Great Lakes region is closely tied to the health of the ecosystem. The challenge of Great Lakes environmental protection and natural resource management is to balance the use of the resources of this unique ecosystem with their conservation.

OUR COMMITMENT

Despite their large size, the Great Lakes are sensitive to a wide range of stressors, including toxic pollution, invasive species, and habitat degradation. It is the mission of the Federal, State, and Tribal Agencies which comprise the United States' Great Lakes Program to work together to ensure the

chemical, physical, and biological integrity of the Great Lakes Basin Ecosystem² for the benefit of its citizens and the prosperity of future generations.

The Great Lakes partners have been working to address these problems in a collaborative and focused way since the early 1990's, following the development of the previous Great Lakes Strategy. This strategy expands upon and incorporates lessons learned from this endeavor. This current strategy is a re-commitment to a set of goals, and identifies an extensive list of high-priority actions to fulfill the mission.

The United States Policy Committee (USPC) forum -- consisting of executive-level representatives of the Great Lakes environmental protection and natural resource management agencies -- has developed and supports the achievement of the goals in this strategy. Future USPC forum meetings will ensure accountability and monitor progress toward completing these actions, as well as recommend corrective measures, if required. International issues will be discussed with our Canadian counterparts at the Binational Executive Committee (BEC) forum, a similar high-level forum with representatives from both countries. There are typically two USPC and two BEC meetings each year.

OUR LONG TERM VISION

The people of the Great Lakes Region will know we have been successful when human health is protected by no longer having to issue health advisories for fish consumption, beach closings, or drinking water; the aquatic environment supports a balanced, self-sustaining fishery; high-quality, ecologically rich areas are preserved; native species can again thrive in the Great Lakes Ecosystem; and land use and water quantity decisions are made with a comprehensive understanding of the environment and the natural ecosystem. This long term vision can be expressed simply, as follows:

- All Great Lakes beaches are open for swimming all the time.
- All Great Lakes fish are safe to eat all the time.
- The Great Lakes are maintained and enhanced as a safe source of drinking water.
- The Great Lakes Basin is a healthy natural environment for wildlife and people.

OUR COLLECTIVE GOALS AND PRIORITIES

In keeping with our mission and long term vision for the Great Lakes, we have expressed our strategic efforts to clean up and protect the Great Lakes under four major areas:

1. Chemical Integrity - Reduce toxic substances in the Great Lakes Basin Ecosystem, with an emphasis on persistent bioaccumulative substances, so that all organisms are protected. Over time, these substances will be virtually eliminated. Maintain an appropriate nutrient balance to ensure ecosystem health.

2. Physical Integrity - Protect and restore the physical integrity of the Great Lakes, including habitats vital for the support of healthy and diverse communities of plants, fish, and other aquatic life and wildlife in the Great Lakes Basin Ecosystem. Protect Great Lakes water as a regional natural resource from diversions and exports.

3. Biological Integrity - Protect human and biological health. Restore and maintain stable, diverse and

² This mission reflects language in the U.S. - Canadian Great Lakes Water Quality Agreement. The actions described in this strategy are consistent with actions needed to fulfill our domestic responsibilities to restore and protect the shared resources of the Great Lakes.

self-sustaining populations of fish and other aquatic life, wildlife, and plants in the Great Lakes Basin Ecosystem, including controlling and eliminating pathogens and preventing the introduction and spread of invasive species to the maximum extent possible, to protect human health, biological health and economic vitality.

4. Working Together - Work together as an environmental community to establish effective programs, coordinate authorities and resources, report on progress, and hold forums for information exchange and collective decision-making, so the Great Lakes are protected and the objectives of the Agreement are achieved.

This last goal addresses the management and institutional challenges to effectively coordinate programs and authorities to achieve the restoration and protection of the Great Lakes.

Under each of the goals, this strategy identifies the major issues or challenges we face, establishes our major efforts to address these issues, and describes how we will work together. It also sets forth a set of key actions we will undertake to carry out, or objectives we will endeavor to meet, which will contribute to the achievement of these broad goals.

The following sections outline our goals, key actions, and objectives, and how we intend to achieve them.

CHEMICAL INTEGRITY: REDUCING AND ELIMINATING THE THREAT OF TOXIC POLLUTION AND EXCESS NUTRIENTS

Goal: To reduce toxic substances in the Great Lakes Basin Ecosystem -- with an emphasis on persistent toxic substances -- so that all organisms are adequately protected. Over time, these substances will be virtually eliminated. Maintain an appropriate nutrient balance to ensure ecosystem health.

Due in part to the long retention time of water in the system (up to 190 years in Lake Superior), the Great Lakes have been impacted by toxic substances. Substances which are persistent and bioaccumulate are the greatest threat. The sources of pollution include the runoff of soils and chemicals from farms and urban areas, contributions of pollution from waste sites, air deposition, industrial and municipal dischargers, and previously contaminated sediments.

Much progress has been made to decrease the threat of toxic substances in the Great Lakes basin. Levels of most toxins have significantly decreased over the time. Chemical inputs to the Great Lakes still continue, causing unacceptable concentrations of these chemicals in water and fish tissue. Many of these toxic inputs are the result of air deposition, which may come from other areas of the continent, or from global long- range transport. Achieving further reductions leading to the virtual elimination of persistent toxic, bioaccumulative chemicals is still a major priority.

The presence of toxics at certain concentrations can negatively impact human health. For example, there are currently numerous fish advisories in the Great Lakes which indicates that toxic substances are still accumulating in the food chain. In addition, new information and research are identifying potential emerging problems with respect to toxics, such as the possible endocrine disrupting nature of some chemicals, which could be the cause of human health effects that are of serious concern.

Implementing the Regulatory Framework: Clean Water Act

The Great Lakes region has long been a site for innovative regulatory efforts to protect human health and the health of the environment. Efforts such as the phase-out of mixing zones (the use of dilution to reduce concentrations in discharges) for persistent, toxic, and bioaccumulative chemicals are now in place and are serving as potential models for the rest of the nation.

A number of regulatory programs provide a foundation for the clean up and protection of the Great Lakes. Key provisions of the Clean Water Act which will be particularly important as tools are discussed below.

An important tool is the Great Lakes Initiative (GLI), which consists of supplemental, more protective water quality criteria for 29 pollutants to protect aquatic life, wildlife and human health in the Great Lakes, as well as detailed methodologies to develop criteria for additional pollutants. This program will reduce direct water discharges of the most persistent, toxic, and bioaccumulative chemicals of concern (bccs) – such as mercury, DDT, PCBs, and dioxins – by up to 90 percent.

Thus far, EPA has approved all eight Great Lakes States' programs specifically tailored to implement GLI, and has found them fully consistent with the standards and Guidance. The Great Lakes States' work in this area has been exemplary, and has positioned the Great Lakes to be a world class leader with regard to advancing water quality regulatory protection. Work will continue on this important effort to fulfill the Great Lakes States and EPA's priority to implement these regulatory approaches.

State, tribal, and Federal actions have listed portions of the Great Lakes and their tributaries as "impaired waters" under 303(d) of the Clean Water Act. These waters do not meet water quality standards even after point sources of pollution have installed the required levels of pollution control technology. The Clean Water Act requires that States and authorized tribes address impaired waters by a Total Maximum Daily Load or "TMDL" determination, which specifies the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and allocates pollutant loadings among point and non-point pollutant sources. Recent state, tribal and federal actions have established priority rankings for Great Lakes waters and have scheduled TMDLs development for these waters. The TMDL effort for each lake will be developed and closely linked to lake wide management planning.

Key Actions/Objectives

-EPA will continue working with states and tribes over the next several years to ensure implementation of the GLI and TMDLs to address BCC's as well as other pollutants. By 2007, X% of all [or: major] NPDES permitted discharges to the Lakes or major tributaries will have permit limits that reflect GLI water quality standards.

-By 200X, ensure all States and tribes develop effective compliance programs with the GLI.

-In accordance with state and tribal approved TMDL schedules, complete TMDL's for each lake or lake segment and the major Great Lakes tributaries.

[Alternatively, a strategic process for TMDL development can be described, including the coordinating forum; the key federal, state, and tribal agencies; and the data collection and analysis efforts in support of TMDL development.]

Achieving the Challenges of the Great Lakes Binational Toxics Strategy

On April 7, 1997 the governments of Canada and the United States adopted *The Great Lakes Binational Toxics Strategy* (“the Strategy” or GLBTS) for the virtual elimination of persistent toxic substances in the Great Lakes. This agreement set a precedent for cooperation between the two countries in the area of toxic reductions. For the first time, the United States and Canada acted together to establish specific, quantitative reduction targets for chemical substances. The Strategy uses pollution prevention as the principal tool in achieving results. The challenge of the Strategy is to adhere to the existing legislation of both nations, while incorporating the interests of a multitude of stakeholders.

Priority substances, identified in the Strategy as Level I Substances, include PCBs, mercury, dioxins and furans, five bioaccumulative pesticides (chlordane, aldrin/dieldrin, DDT, mirex, and toxaphene), octachlorostyrene, alkyl-lead, hexachlorobenzene, and benzo(a)pyrene. By 2006, the Strategy stipulates that both countries will have met their respective reduction targets for each of the Level I Substances, established according to baseline measurements. Management of Level II Substances, undertaken through pollution prevention activities and in compliance with the laws and policies of each country, will be at the discretion of the various stakeholders of the Strategy.

Implementation of the Strategy has been proceeding along a path devised by the Stakeholders in June of 1997, following the analytical framework laid out in the Strategy. The Stakeholders designated substance-specific Work Groups to adhere to the four steps of this framework: information gathering, analysis of current regulations and programs, identification of cost-effective opportunities for further reductions, and implementation of actions for virtual elimination. The Integration Group provides administrative and organizational support to the Work Groups, and has a substantial role in presenting workshops that explore models, technologies, and other methods for pollution prevention and toxic substance reductions.

The Great Lakes Binational Toxics Strategy implementation is carried out in a flexible, participatory, and action-oriented manner. The Strategy can also be envisioned as a model for other regions with similar problems. Progress on strategy implementation is ongoing. During the first three years of implementation, under a mercury reduction challenge, the chlorine industrial sector reduced consumption of mercury by 42% (on a production adjusted basis). A number of key partnerships have also been initiated with the health care sector, and the iron and steel sector.

For more information, see <<http://www.epa.gov/glnpo/bns/index.html>>.

Key Actions/Objectives:

-By 2006, achieve all Challenge Goals of the Binational Toxics Strategy, making measurable and reportable progress, particularly:

-A 90% reduction nationally of high level PCB's (greater than 500ppm) used in electrical equipment.

-A 50% reduction nationally in the deliberate use and a 50% reduction nationally in the release of mercury from sources resulting from human activity.

-A 75% reduction nationally in total releases of dioxins and furans from sources resulting from human activity.

-Continue to initiate pesticide Clean Sweep programs in the basin to promote the safe disposal and elimination of toxic substances.

-By 2006, create ten additional voluntary partnerships with industrial sectors that assist in meeting the challenges.

-By 2007, evaluate the implementation of the Strategy and develop process to renew commitments and challenges.

Addressing Impacts from Air Deposition

Great Lakes researchers have collected a large amount of data demonstrating that air pollutants can be deposited on land and water, sometimes at great distances from their original sources. For example, mercury and hexachlorobenzene are capable of being transported through the air on a global scale. Because of mounting information that air pollution can contribute significantly to water pollution, the Clean Air Act Amendments, known as the "Great Waters" program, requires EPA, in cooperation with the National Oceanic and Atmospheric Administration, to investigate the air deposition of hazardous pollutants by establishing sampling networks and evaluate any adverse effects to public health and the environment.

The effect of air deposition on the Great Lakes is monitored through the Integrated Atmospheric Deposition Network (IADN) since 1990. Data from the IADN has shown that concentrations of many of these pollutants have decreased or leveled off in recent years. However, fish consumption advisories continue to be in effect in the Great Lakes for PCBs, mercury, and other pollutants, and atmospheric deposition is a major contributor of these substances to the Lakes.

This work will also be informed by the Lake Michigan Mass Balance Study (LMMB). The LMMB focuses on four chemicals that are representative of classes of pollutants in Lake Michigan and throughout the Great Lakes: PCBs (industrial compounds), trans-nonachlor (pesticides), atrazine (herbicides), and mercury (metals). The LMMB will identify chemical loading rates, establish baselines for gauging progress, predict benefits of various management strategies, and improve our understanding of key environmental processes governing contaminant cycling.

Working together, we will continue to support monitoring efforts, work to reduce international sources, and support model development that clarifies linkages between sources of air pollutants and effects of their deposition in the Great Lakes. This information will guide the development of standards for air discharges that eliminate the impacts of air deposition.

Key Actions/Objectives:

- Continue to operate the Integrated Air Deposition Network (IADN) to measure concentrations and loadings of persistent toxic pollutants. In addition, seek ways to integrate IADN with new regional, national, and international monitoring efforts.

- By 200X, expand at least one U.S. IADN station to include mercury precipitation monitoring. Evaluate the feasibility and cost of adding additional chemicals of concern to the network, as appropriate.

-For air deposition, report each year on the amount of BCCs deposited using the Integrated Air Deposition Network (IADN).

- *MACT standards for HAPs from all major sources will be in place by May 2002;*
- *Implementation of emissions standards for municipal waste combustors and medical waste incinerators will reduce mercury and dioxin from these sources by 90% and 95% by 2004.*
- *Area source standards will be in place to control HAP emissions from 90% of area sources by 2003.*
- *EPA has determined that mercury emissions from coal-fired utilities also warrant regulation and will issue a proposed rule in 2003.*

- Continue to implement key provisions of the Clean Air Act, such as the Maximum Achievable Control Technology (MACT) standards, and other initiatives, such as EPA's Combustion Strategy, to ensure air deposition is reduced and impacts to the Great Lakes eliminated.

- EPA and the Great Lakes States will work together to finalize and implement a Great Lakes Air Deposition Strategy by 2002.

- EPA will continue to implement the Air-Water Interface Workplan was developed by EPA's Office of Air and Radiation and Office of Water in order to coordinate efforts by both offices to reduce air deposition.

Achieving Out-of-Basin Toxics Reductions

A key issue for the Great Lakes is to address the challenges posed by persistent toxic pollutants due to their ability to easily transfer among air, land and water and span geographic boundaries, making single-media approaches less than optimal for reducing persistent toxic substances in the Great Lakes. The Great Lakes are particularly sensitive to the affects of airborne toxic deposition due to their large surface area, cooler temperatures, and long retention time. Toxic substances, many from far away, are deposited in the lakes, which then bioaccumulate in the food chain. There are several key mechanisms for addressing these issues of transboundary concern.

Recognizing the need for a cross-program, multi-media approach to persistent toxics, the Great Lakes Binational Toxics Strategy works closely other domestic and international programs. Recognizing the need to address out-of-basin sources toxic substances, the GLBTS works closely with other domestic and international programs. On a national level, the Persistent Bioaccumulative Toxins Initiative (PBTI) is a multi-media approach to controlling persistent toxic substances. Both the PBTI and GLBTS are focused on reductions for the same set of pollutants, and the efforts of the GLBTS chemical-specific workgroups have supported the development of the PBTI national action plans.

The GLBTS also works with the Office of International Activities to support international efforts, such as the Persistent Organic Pollutants and Heavy Metals Protocols negotiated under the UN ECE's Convention on Long Range Transboundary Air Pollution and the North American Commission for Environmental Cooperation (CEC) Sound Management of Chemicals Program. These efforts work toward international voluntary activities and legally-binding agreements resulting in reductions of persistent toxic substances.

Key Actions/Objectives:

- Continue to support and coordinate with initiatives that will reduce or eliminate out of basin inputs of toxics to the Great Lakes, including the Persistent Bioaccumulative Toxins Initiative.

- Support actions in the CEC's North American Regional Action Plan (NARAP) for mercury.

Cleaning Up Past Contamination: Sediments

Contaminated sediments are a significant problem in the Great Lakes basin. Due to the highly industrialized nature of many harbors and tributaries on the Great Lakes, these areas have historically received inputs of chemical pollutants. Decades of point and non-point source discharges from industrial and municipal facilities and urban and agricultural runoff to the Great Lakes have significantly contributed to this contamination.

Although discharges of toxic substances to the Great Lakes have been reduced in the last 30 years, persistent, high concentrations of contaminants in the bottom sediments of many rivers and harbors have raised considerable concern about risks to aquatic organisms, wildlife and humans. Exposure to contaminated sediment may impact aquatic life through the development of cancerous tumors, loss of suitable habitat, and toxicity to fish and benthic organisms. Exposure also impacts wildlife and human health via the bioaccumulation of toxic substances through the food chain. As a result, advisories against fish consumption are in place in most locations around the Great Lakes.

There are economic consequences to contaminated sediments as well. They can prevent or delay the dredging in federal navigational channels, imposing costs to waterborne commerce.

In recent years, Congress has enacted legislation giving the Corps of Engineers authorities to support State, local and tribal agencies responsible for addressing contaminated sediment problems. Section 401 of the Water Resources Development Act (WRDA) of 1990, as amended, enables the Corps to provide technical support for Remedial Action Plan development and demonstrate promising technologies for remediating contaminated sediments. Section 312 of WRDA 1990 enables the Corps to remove and remediate contaminated sediments from areas outside Federal navigation channels.

EPA and States will continue to address contaminated sediments through their respective enforcement authorities, including the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Clean Water Act (CWA) and Toxic Substances Control Act (TSCA) and also through innovative approaches and Federal/State private partnerships. These will provide a coordinated effort to bring together complementary Federal and State authorities, and/or government and private resources to address the contaminated sediment problem and its sources. EPA has completed, or is currently addressing the remediation of over 1.3 million cubic yards of contaminated sediments in the basin, principally within the Areas of Concern, at an estimated cost of over three hundred million dollars. This work is a small fraction of the total effort necessary to fully remediate contaminated sediments in the Great Lakes.

Key Actions/Objectives:

-EPA will address X contaminated sediment sites through removal, capping, or other means by 2007.

- *Status quo: rely on existing program efforts (mostly Superfund) to clean up 1-2 sediment sites per year or about 10 sites by 2007;*
- *More focus on Great Lakes sediments with existing resources: could address 2-4 sites per year or about 20 sites by 2007. Requires 1) cross-EPA commitments to focus resources on GL sediment sites, e.g., Superfund, RCRA, CWA enforcement, and 2) leveraging efforts with the Corps of Engineers and other agencies;*

- *Substantial budget increase for AOC cleanup: could address 4-6 sediment sites per year (after initial lag of 2+ years) or about 30 sites by 2007 including some of the largest, most troublesome sites.*

-By (year), work with States, tribes, and other Agencies to remediate (#) of sediment sites, contributing to the restoration of beneficial uses at Areas of Concern.

-By (within one year of signature of strategy), working with EPA, each State will develop a list of sites for remedial activities, with projected costs and completion dates, and report progress.

-Address X number of contaminated sediment sites through removal, capping, monitored natural attenuation, or other means.

Eliminating Fish and Wildlife Consumption Advisories

Many Americans enjoy fishing and hunting and many get their livelihood from these activities. Protecting Americans from exposure to unhealthy levels of contaminants in fish and wildlife where such activities occur is a high priority. Exposure to contaminated fish and wildlife can cause health effects and pose a special risk to children, women of child-bearing age, and subpopulations who fish or hunt for food or sport. One hundred percent of the Great Lakes waters and their connecting channels are currently under an advisory, mainly due to PCBs. Dioxin, chlordane, and mercury also cause advisories. There is significant uncertainty about the extent of exposure through these activities, and EPA will work to improve the understanding of this issue. The long term goal is to ensure all Great Lakes fish are safe to eat without restriction.

Key Actions/Objectives:

-Concentrations of PCBs in Lake Trout will decline by half by 2007 (compared to 2000 levels).

-Report on PCB levels in fish tissue every two years.

-Working with states and tribes, support and provide expanded communication to the (non-commercial) fish-eating public about the importance of following existing fish consumption advisories.

-Concentrations of key pollutants (PCB's, dioxin, chlordane, and mercury) (mercury would have to added to GLNPOs current trend monitoring program) in selected Great Lakes fish (which species/) (lake trout, chinook, and coho are currently monitored as part of long term trend programs) (will decline by 10% per year through 2007, or will decline by half by 2007.

-By (year), improve systems for communicating fish advisory information to targeted communities and populations.

-By (year), communicate fish advisory information via effective mechanisms to (#) members of sensitive populations.

Maintaining A Healthy Nutrient Balance

Phosphorus is an essential element for all organisms and is often the limiting factor for aquatic plant growth in the Great Lakes. Although phosphorus is found naturally in tributaries and run-off waters, the historical problems caused by elevated levels have predominately originated from human-made sources.

Sewage treatment plant effluent, agricultural run-off and industrial processes have released large amounts of phosphorus into the Lakes.

Strong efforts that began in the 1970s to reduce phosphorus loadings have been successful in also reducing nutrient concentrations in the Lakes, although high concentrations still occur locally in some bays and harbors. Phosphorus loads have decreased in part due to changes in agricultural practices (e.g., conservation tillage and integrated crop management), use of non-phosphorus detergents, and improvements made to sewage treatment plants and sewer systems.

Our overall approach is to ensure that Great Lakes waters shall be free from nutrients directly or indirectly entering the waters as a result of human activity in amounts that create growths of aquatic life that interfere with beneficial uses.

Key Actions/Objectives:

-Continue to monitor phosphorus concentrations closely by environmental and fishery agencies to ensure nutrient levels can support desired fish community structures and populations.

-Evaluate the need for the following future activities:

- Construct and test math models of nutrient cycling in each of the Great Lakes to account for the role now played by zebra mussels;
- Assess the capacity and operation of existing sewage treatment plants in the context of increasing human populations being served. Additional upgrades in construction or operations may be required;
- Conduct sufficient tributary monitoring to support the calculation of annual loadings of phosphorus to each Great Lake by source category (i.e., sewage treatment plants, tributaries, etc.). If the phosphorus concentrations remain stable at or below the maximum target levels for four of the Lakes, loadings information might be useful, but not critical. Increasing concentrations like those observed in Lake Erie, however, stimulate a concern to identify the relative loadings contributions to all the lakes.

PHYSICAL INTEGRITY: PROMOTING HABITAT PROTECTION, WATER QUANTITY MANAGEMENT, AND IMPROVING LAND USE PRACTICES

Goal: Protect and restore the physical integrity of the Great Lakes, including habitats vital for the support of healthy and diverse communities of plants, fish, and other aquatic life, and wildlife, in the Great Lakes Basin ecosystem. Protect Great Lakes water as a regional natural resource from diversions and exports. Promote improved land use practices.

The Great Lakes are unique freshwater ecosystems, containing many ecologically rich areas and an abundance of rare native species and community types. We are at risk of losing many of our valuable natural areas which could provide necessary habitats, as well as recreational areas. Areas of importance are concentrated in various parts of the basin, and they include terrestrial forests, freshwater dunes, coastal wetlands, and aquatic habitat. These areas are important to provide essential habitat for important native plant, fish, and wildlife species.

Urban sprawl, loss of productive agricultural land, and the problems of urbanization and brownfields, have become priorities for Federal, State, tribal, and local governments. Near shore urbanization and loss of recreational shoreline is a problem in the Great Lakes and will continue as the population increases.

Habitat Protection and Restoration

The Great Lakes Basin contains a number of unique and important ecosystems, including sand dunes, northern forests, alvars, wild rice beds, coastal wetlands, aquatic spawning reefs, and many others. The long-term restoration and protection of these ecosystems will require the cooperation of a wide variety of partners because these resources span across traditional political and organizational boundaries.

“Biodiversity Investment Areas” have been identified in the Great Lakes Basin to assist and aid local land use jurisdictions as they develop protection and restoration plans.

The successful Chicago Wilderness effort, for example, now includes over 100 partner organizations from a variety of levels, from volunteers to federal agencies. Opportunities need to be undertaken to establish ecosystem-sized initiatives elsewhere in the basin. These efforts will build upon local infrastructure to establish cooperative efforts for the identification and management of the resources of a given ecosystem, enhance existing partnerships and volunteer opportunities, and lead to on-the-ground restoration and protection. These initiatives differ from single site efforts because they address the long-term, active management of a resource.

Key Action/Objectives:

-By (year), create partnerships to protect and restore (#) of biodiversity priority action sites in the Great Lakes basin.

-Support recovery of the bald eagle so that by 2007 GL nearshore areas sustain the recovery of eagle populations and achieve a 10% increase in occupied nests producing at least one young eagle per year.

- *By 2007 support X projects to provide bald eagle habitat (e.g., providing suitable nesting sites and buffer areas) or to improve water quality so that eagle food sources are improved.*

Special Focus Area: Coastal Wetlands

Great Lakes coastal wetlands are a distinct and important, but diminishing, resource to the Great Lakes. They are ecologically unique because they are dominated by large lake processes, such as water level fluctuations, wave actions, and wind tides or "seiches." Spanning a diversity of types and the full geographic range, including freshwater estuaries, lagoons and deltas, Great Lakes coastal marshes sustain a tremendous number and diversity of resident and migratory species. Great Lakes coastal marshes play a pivotal role in the aquatic ecosystem of the Great Lakes, storing and cycling nutrients and organic material from the land into the aquatic food web. They sustain large numbers of common or regionally rare bird, mammal, herptile and invertebrate species, including land-based species that feed from the highly productive marshes. Most of the lakes' fish species depend upon them for some portion of their life cycles. Large populations of migratory birds rely on them for staging and feeding areas.³

³ The Conservation of Biological Diversity in the Great Lakes Ecosystem: Issues and Opportunities

Coastal wetlands have been identified as a special focus area and actions will be taken to inventory, restore, and monitor efforts in these important ecosystems. These activities will be carried out by a Great Lakes Coastal Wetlands Consortium that is being formed and will be implemented in early 2001. The Consortium has over twenty partners, comprised of Federal, State, tribes, and non-profit organizations, and is binational as well.

Key Actions/Objectives:

-Form and implement the Great Lakes Coastal Wetlands Consortium in early 2001. [NOTE: the Consortium is addressing monitoring of coastal wetlands. Protection/restoration activities would need to be implemented by other forums.]

- Over the next decade, protect and restore 100,000 acres of coastal wetlands, and measurably decrease the loss of inland wetlands.

-By 2010, work with partners to restore, protect, or enhance 100,000 acres of wetlands in the Great Lakes basin.

- *By 2005 work with partners to achieve X wetlands restoration/protection projects identified via RAPs, LaMPs, watershed assessments, TMDL process, etc.*
- *By 2003, design and establish a program for monitoring the quantity and quality of GL coastal wetlands, partnering with the GL Commission and others. Use information from this effort to identify, prioritize coastal wetlands projects.*

- By 200X, design a long-term program to monitor Great Lakes coastal wetlands;

- By 200X, create, and populate, a binational GIS database accessible to all scientists, decision makers, and the public on Great Lakes coastal wetlands.

Protection of Great Lakes Water Resources

The diversion of water from the Great Lakes Basin has become a high profile issue, both nationally and internationally, over the last few years. The most notable story centered around a Canadian company's 1998 proposal to export Lake Superior water to markets overseas. Throughout the basin, concerns were voiced over the lack of consultation and the environmental implication of the withdrawal. The request was subsequently withdrawn. This situation brought diversion issues to the top of the Great Lakes agenda. The long term goal is to manage Great Lakes water resources in a sustainable manner to protect the Great Lakes Ecosystem, while maintaining a strong economy.

Key Actions/Objectives:

- In accordance with section 504 of the Water Resources Development Act of 2000, finalize and implement the Great Lakes Governors' and Premiers' "*Agreement in Principle*" on conservation-based standards for water withdrawals.

Smart Growth and Brownfields

In communities across the Great Lakes Region, there is a growing concern that current development patterns--dominated by what some call "sprawl"--are not in the long-term interest of the inner cities,

existing suburbs, small towns, rural communities, or wilderness areas in the basin. The cost of abandoned infrastructure in the city, loss of open space and prime agricultural lands at the suburban fringe, and polluting the air of an entire region by driving farther to get places, all impacting the basin, has spurred the Smart Growth movement. It is estimated that there could be as many as 100,000 brownfield sites in the Great Lake States, many of which are in the basin

The USPC supports the Smart Growth Network, a growing coalition of developers, planners, government officials, lending institutions, community development organizations, architects, environmentalists and community activists all stakeholders in the development process. By building coalitions and partnerships, developing information and analytical tools and programs and establishing dialogues among development stakeholders, the Smart Growth Network hopes to encourage more environmentally and fiscally responsible land use, growth and development.

A key component in the Smart Growth movement is brownfield redevelopment. A brownfield is a site, or portion thereof, that has actual or perceived contamination and an active potential for redevelopment or reuse. Many areas across the country that were once used for industrial and commercial purposes have been abandoned--some are contaminated. The Great Lakes basin, traditionally the most industrial sector of the United States, has been particularly hard hit by the loss of manufacturing and other living wage jobs, resulting in abandoned brownfields. Because lenders, investors, and developers fear that involvement with these sites may make them liable for cleaning up contamination they did not create, they are more attracted to developing sites in pristine areas, called "greenfields."

USEPA's Brownfields Economic Redevelopment Initiative is designed to empower states, communities, and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and sustainably reuse brownfields. Great Lakes States have also taken leadership role in Brownfields redevelopment. For example, in FY1998, Michigan passed the Clean Michigan Initiative bond, a \$650MM program focused on cleaning up brownfields and farmland preservation. Similarly, in FY2000, the State of Ohio passed Issue 1, a \$400MM program also aimed at brownfields restoration and farmland preservation. All Great Lakes States also have voluntary cleanup programs, by which many of the brownfield sites are remediated. The Great Lakes Commission has also done much work on Brownfield and Greenfield policy development at the Federal state and local level through its Bridges projects.

Key Actions/Objectives:

- Continue to Support the Smart Growth Network and its objectives
- USEPA and other Federal agencies, and State agencies will continue to support local brownfield redevelopment efforts through funding and implementation of :
 - Site assessment, job training, cleanup revolving loan funds, and showcase community pilot programs, federal tax incentives to brownfield redevelopment, programs which fund site pre-development and infrastructure needs, including transportation, demolition, and other necessary activities to revitalize brownfield sites.
 - State voluntary cleanup programs, and brownfield programs that provide technical assistance to local brownfield practitioners, and various financial incentives to brownfield redevelopment.

- Interagency and interjurisdictional partnerships such as the Brownfields National Partnership
- Technical assistance such as the field services from U.S. Army Corp of Engineers and the U.S. Geological Survey.

Promoting Conservation Practices on Agricultural Lands

Major efforts over the last several years have continued to promote the reduction of pesticide and nutrient run-off through improved agricultural practices such as conservation tillage and the use of buffer strips, while also addressing the more recent problem of large-scale animal production farms.

Conservation tillage is rapidly becoming the primary cultivation practice in the Basin, affecting as much as 70 percent of the total acreage in many counties, and 48 percent basin wide. Innovative programs such as USDA's Conservation Reserve Program (CRP), National Conservation Buffer Initiative, and Environment Quality Incentive Program (EQIP) provide a "systems approach" for addressing agricultural non-point source pollution to the Great Lakes. This approach ensures the sustainable production of food and fiber products while maintaining environmental quality and a strong natural resource base. In addition, U.S. EPA has several standing programs to address soil erosion and sedimentation within the Basin.

Thirty-eight percent of the nation's animal feeding operations exist in the Midwest. In 1999, the USDA and the EPA issued a Unified National Strategy to minimize the water quality and public health impacts of animal feeding operations. Continuing the implementation of the Unified National Strategy will promote activities to address water pollution from concentrated animal feeding operations.

Key Actions/Objectives:

- Implement and track the national goals for the Conservation Reserve Program, National Conservation Buffer Initiative, and Environment Quality Incentive Program, in the Great Lakes basin.

Addressing Wet Weather Events (CSO and SSO)

With increasing urban growth, storm water discharges are a growing concern in the Great Lakes. After heavy rains or snowmelt, pollutants are collected by storm drains and transported directly to nearby waters. In addition, systems can be overwhelmed by high flows, resulting in the release of raw sewage by combined sewer overflows (CSO) and sanitary sewer overflows (SSO). EPA and the Great Lakes States are working together to reduce the threat of wet weather discharges to water quality, while reducing redundant pollution control costs.

Key Actions/Objectives:

-By 200X, storm water permits will be in place for municipal and industrial storm water runoff, combined sewer overflows (CSO), and sanitary sewer overflows (SSO) in the Great Lakes basin.

[Alternatively, a strategic process for developing storm water permits can be described, including the coordinating forum; the key federal, state, and tribal agencies; and the data collection and analysis efforts in support of permit development.]

BIOLOGICAL INTEGRITY: PROTECTING HUMAN HEALTH AND THE ECOSYSTEM'S SPECIES

Goal: To protect human health and restore and maintain stable, diverse, and self-sustaining populations of plants, fish and other aquatic life, and wildlife and in the Great Lakes Ecosystem.

Our first two goals - reducing toxic pollution and protecting habitats - will improve the fundamental capacity of the Great Lakes Ecosystem to sustain life. This goal addresses other actions needed to protect human health and the health of other species. The public requires safe drinking water and clean beaches, as well as clear warnings about periods when these resources may be compromised, to ensure their well-being. Other species that share this ecosystem need to be protected from human activities, such as the introduction of new non-indigenous invasive species. The following actions are needed to ensure our continuing enjoyment of all these resources.

Human Health Studies

The Agency for Toxic Substances and Disease Registry (ATSDR) Great Lakes Human Health Effects Research Program (GLHHERP) has made significant progress in evaluating and reporting findings that address public health issues from exposure to contaminants in the basin. The program has been proactive in initiating risk communication and public health intervention strategies in sensitive populations to reduce their exposure to persistent toxic substances. Continued support of our Great Lakes research program is vital to the success of the overall research effort in the basin and our capacity to address key human health research gaps in the years ahead. Conclusions and findings from these studies will be assessed and will feed into management actions and research plans.

Maintaining the Great Lakes as a Safe Source of Drinking Water

The Great Lakes have been an abundant and high quality source of drinking water for millions of people historically. We must assure that the Great Lakes continue to provide a safe source of drinking water for residents of the basin. We will work together to carry out several initiatives that will assist us in meeting this goal.

The SOLEC (State of the Lakes Ecosystem Conference) and the American Water Works Association will undertake a joint binational effort to assess the quality of water at 22 drinking water treatment plants around the Lakes. These plants monitor parameters such as Total Organic Carbon (TOC), turbidity, and microbial indicators. Measurement of these parameters over time at the U.S. locations will provide a useful snapshot of the untreated water as it enters the drinking water treatment system.

In addition, we will be implementing key provisions of the Safe Drinking Water Act (SDWA) to ensure Great Lakes water meets standards and is of a high quality. The Stage 1 Disinfectants and Disinfection Byproducts Rule will require most large surface water plants, including those on the Great Lakes, to begin monitoring Total Organic Carbon (TOC) of raw waters by January of 2002. TOC levels are an important indicator of water quality and the potential formation of disinfection byproducts. EPA will work with the States to compile TOC data for Great Lakes drinking water plants and report it to the public.

The SDWA requires Source Water Assessments (SWAs) to be completed by 2003 for all public water systems. SWAs are largely qualitative assessments of potential vulnerabilities in the system, identifying intake points, potential contaminant sources, drainage area, etc. SWA's are conducted by the States and tribes, and implementation measures to reduce vulnerabilities will be carried out by the States, tribes, and local governments.

Key Actions/Objectives:

-Beginning in 2002, EPA will track and biannually report to the public on water quality at the intake points of selected drinking water treatment plants around the Lakes.

-Beginning in 2003, EPA will compile and report to the public annually on TOC levels in Great Lakes source water prior to treatment at drinking water systems serving more than 10,000 people.

-By 2008, EPA will work with state and local governments to achieve implementation of X projects to address significant vulnerabilities identified in Great Lakes Source Water Assessments (SWA's).

These actions will help ensure that the Great Lakes are maintained and enhanced as a safe source of drinking water.

Promoting Clean and Healthy Beaches

Most Great Lakes beaches provide a safe and enjoyable location for outdoor recreation and swimming. Past monitoring studies have shown that beach pollution is usually infrequent or confined to areas near pollution sources after a heavy rainfall or where a sewage treatment plant malfunctions. However, recent increases in beach closings have suggested that there may not be enough information available now to fully define the cause and extent of beach pollution throughout the basin.

The majority of beach closings are due to indications of the presence of high levels of harmful microorganisms (e. coli) found in untreated or partially treated sewage. Most of this sewage enters the water from combined sewer overflows, sanitary sewer overflows, and malfunctioning sewage treatment plants and septic tanks. Untreated stormwater runoff from cities and rural areas can be another significant source of beach water pollution.

EPA, in concert with state and local agencies, will implement the newly passed Beaches Environmental Assessment and Coastal Health Act (BEACH Act) of 2000. The Act requires each State having coastal waters (includes the Great Lakes) to review current water quality criteria and standards for coastal recreation waters of the State for certain pathogens. The Act also authorizes studies and assessments regarding human health impacts of pathogens, and the development of indicators for improving detection of pathogens in coastal waters. State regulatory programs and actions are designed to reduce human health exposure to harmful bacteria, viruses and fungi. State voluntary programs for pollution prevention utilizing partnerships with NRCS, Extension, state agricultural agencies and conservation districts (e.g. Michigan' Agricultural Environmental Assurance Program) should be encouraged to complement regulatory approaches.

Key Actions/Objectives:

- Implement the BEACH Act (s.522 of the FWPCA) within statutory deadlines to promote healthy Great Lakes beaches and coastal areas, and to ensure such areas are free from human health impacts.

-By 2007, X% of monitored high use/high risk Great Lakes beaches are open for swimming more than 95% of the swimming season (swimming days).

-Work with state and local governments and federal agencies to reduce or eliminate closings at X beaches by focusing implementation of regulatory and funding programs (e.g., SSO/CSO, TMDLs, CWSRF and DWSRF), and funding locally sponsored watershed and beach protection efforts.

-Provide tools and available funding to state and local governments to improve infrastructure for monitoring Great Lakes beach water quality, communicating to the public, and implementing actions to reduce closings.

Restoring Desirable Species

The fishery resources of the Great Lakes are held in trust for society by the government. The agencies responsible for them have been charged to manage the fishery resources and fisheries to provide continuing valuable contributions to society. These contributions include such benefits as a healthy aquatic environment, aesthetic and recreational values, scientific knowledge and economic activity as well as fish and fishing opportunities.

Stresses affecting fishery resources rarely act singly, often having complex interactions, and often impact several levels of the aquatic ecosystem so that remedial management must address problems on a comprehensive whole-system basis. A natural focus of the fishery agencies, therefore, is the maintenance and development of entire fish communities which can provide improved contributions to society. Such an ecosystem approach requires protection and rehabilitation of aquatic habitat and fishery management to ensure stable self-sustaining foundations, especially at forage levels, for the community while allowing for judicious stocking of hatchery-reared fish to complement or enhance natural production at higher levels, meet public demands and rehabilitate depleted stocks of desirable species. The Great Lakes Fishery Commission (GLFC) -- a binational organization consisting of members from the Federal, tribal and State fishery agencies -- is responsible for developing plans and programs to ensure the sustained productivity of the Great Lakes' fishery. GLFC's Lake Committees have been established for each lake and have developed fish community objectives for designated species in each lake.

Key Actions/Objectives:

- Support GLFC Lake Committees' fishery management efforts so that each lake supports a healthy and productive fishery, including naturally reproducing populations of native fish. Lake Trout will be maintained as the top predator in Lake Superior.

Preventing Unplanned Introductions and Controlling Invasive Species

The discharge of ballast water from transoceanic ships is recognized as a major vector for new introductions of invasive species. It also has the potential to be a source of pathogens. Open-ocean ballast exchange is currently the primary method for preventing invasive species introductions via ballast water. It has proven inadequate, however, and also poses serious safety concerns for some vessels. A further challenge is presented by vessels entering the Great Lakes with "no ballast on board" (NOBOB). NOBOB vessels typically carry some residual sediment and slop which may be a source of introductions.

Since 1991, the Great Lakes Panel on Aquatic Nuisance Species (ANS) has worked to prevent and control the occurrence of aquatic nuisance species in the Great Lakes. The panel membership is drawn from U.S. and Canadian federal agencies, the eight Great Lakes states and the province of Ontario, regional agencies, user groups, local communities, tribal authorities, commercial interests, and the university/research community.

Preventing introductions of invasive species is a major agenda item for the Great Lakes ANS Panel and beyond the region. Many investigations and policy initiatives are proposed or underway. This topic is likely to be addressed during the process of re-authorizing the National Invasive Species Act, which is expected to occur in 2001.

We will focus on four major issues concerning the management of ballast water:

- The effects of ballast water exchange on different classes of ships to ensure safety.
- The organisms and pathogens which may remain present in the ballast tanks of NOBOB vessels.
- Possible criteria or regulatory guidance for ballast water management/treatment.
- Estimates of costs and economic impacts of ballast water technologies, including shore side facilities, as well as chemical/heat treatment.

This information will be provided to Congress for consideration during the re-authorization of NISA, as well as well as to the International Maritime Organization policy forum which is currently addressing ballast water management.

[The GLC could be charged with reporting out to the USPC following Great Lakes ANS Panel meetings, to advise USPC membership of opportunities for coordination of research and on unmet needs.]

Key Actions/Objectives:

-By 20XX, there will be no new discharges of invasive species via ballast water.

-Promote the adoption of expanded activities as follows:

- *design a comprehensive invasive species prevention program consisting primarily of research, development, and dissemination of commercially viable ballast water treatment technologies;*
- *design and conduct biological monitoring to verify objective is being met and enable early response to prevent the spread of any new species; and*
- *report to the public.*

- By (year), develop and implement management plans for X exotic species posing the greatest threat to the restoration and integrity of the Great Lakes Basin Ecosystem.

- By (year), all saltwater vessels entering the Great Lakes will discharge ballast water free from biological agents, leading to no new species introductions.

WORKING TOGETHER: EFFECTIVELY COORDINATING PROGRAMS AND RESOURCES TO ENSURE THE GREAT LAKES ARE PROTECTED AND RESTORED

Goal: To work together as an environmental community to establish effective programs, coordinate authorities, and hold forums for information exchange and collective decision-making, so that the Great Lakes are protected and the objectives of the Agreement are achieved.

Implementing the Great Lakes Water Quality Agreement

There has been over 90 years of international and interstate cooperation on Great Lakes issues, which began in 1909 with the signing of the Boundary Waters Treaty. Four of the five lakes are shared with Canada. The GLWQA was signed in 1972, and was amended in 1978; in 1983; and again in 1987. It was reviewed by the Parties during the 1999-2000 time frame and will be reviewed periodically in the future.

The Agreement established goals and specific commitments, including a management program designed to monitor and control pollution and water quality on a basin-wide basis. These goals lay the groundwork for joint binational priorities and strategies to clean up and protect the Great Lakes. The GLWQA has served as a prime example of international cooperation to address issues of mutual concern; the evolution of this institutional framework may serve as a model for other areas of the country; and for other countries to follow into the 21st century.

The Great Lakes program is characterized by several levels of problem definition: "Lakewide" and localized "Areas of Concern". Pollution problems need to be addressed at dramatically different scales to design effective prevention and control strategies. Therefore, the Great Lakes Program is really a "nested" set of activities, managed and implemented by an alliance of federal, state, tribal, and non-government agencies. Lakewide Management Plans (LaMPs) and Remedial Action Plans (RAPs) are the major organizing tools of the program. Success in managing the Great Lakes will require binational cooperation, as well. We have included information in this strategy that explains how we work at the many scales needed for successful management strategies with regard to the Great Lakes.

The International Joint Commission's Oversight Role

The International Joint Commission (IJC) was established under The Boundary Waters Treaty of 1909. The Commission is an independent international organization charged with preventing and resolving disputes over the use of waters shared by the United States and Canada. Under the Great Lakes Water Quality Agreement, the Commission assesses progress to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem. The IJC's Water Quality Board is the principal advisor to the International Joint Commission on all matters related to the Great Lakes Water Quality Agreement.

We will continue to coordinate with the IJC and its boards, under existing mechanisms and protocols, including reporting progress and evaluating recommendations they provide to improve Agreement implementation.

Implementing Lakewide Management Plans

The Great Lakes Basin presents challenges owing to its vast area, multiple-jurisdictions, and the unique character and nature of each Lake and its problems. For these reasons, a separate LaMP has been, or will be developed for each Lake. Each LaMP's primary goal is to support the overall goal called for in the Agreement to restore the chemical, physical, and biological integrity of the Great Lakes, and to serve as a mechanism to more specifically address a variety of ecosystem stressors or beneficial use impairments, such as critical pollutants, habitat protection and loss, nutrient loadings, and the control of invasive species. Loadings of critical pollutants to the open lake waters will continue to be reduced through the development and implementation of the LaMPs.

The LaMPs will serve as the primary delivery mechanism for the coordination and planning of environmental/ecosystem protection activities for the Lakes. Each LaMP includes an identification of priority actions, and implementation schedules and responsibilities. As of the date of this strategy, LaMPs for Lakes Michigan, Superior, Erie and Ontario have been published. A Lake Huron Initiative (LHI) was begun in 1999, was published, and continues to move forward. The Parties have agreed to issue LaMP updates every two years, including reporting progress and incorporating new information as it becomes available. The LaMP process will assist in coordinating U.S. activities with Canadian Federal and Provincial governments, and among Federal, State, and Tribal agencies within the U.S.

Key Actions/Objectives:

-By April 2002, complete update of LaMPs and report on implementation progress.

Cleaning Up Areas Of Concern Through Remedial Action Plans

The U.S. and Canada has identified 42 geographic problem areas around the lakes called "Areas of Concern" (AOC's). There are 31 AOC's in the U.S., and five of these are shared with Canada. For each AOC, a Remedial Action Plan (RAP) has been developed. Each RAP takes an ecosystem approach and identifies the nature, cause, and extent of environmental problems (beneficial use impairments) and develops appropriate remedial actions.

Remedial Action Plans lay out a variety of actions, including use of Federal and state programs and authorities to assist in remedial efforts. Clean up work in these areas has gone on for several decades and recently, there has been heightened attention to accelerate clean up and to move areas toward delisting.

USEPA, its federal partners and the States will continue to clean up Areas of Concern and will move forward in the future to delist areas having beneficial use impairments restored. Together we have formed a workgroup to develop a process of delisting these areas, and a final "U.S. Delisting Principles and Guidance" will be published by the end of 2001.

Key Actions/Objectives:

- Complete final U.S. Delisting Principles and Guidelines by the end of 2001.

- By 2002, evaluate the use of a new management paradigm for AOC's that better demonstrates and tracks progress.

-Bring all RAPs to implementation phase by 2005.

-Delist at least three AOC's by 2005 and a cumulative total of 10 by 2010. AOCs that are initial candidates for meeting the first part of this goal are Waukegan Harbor, IL; Presque Isle, PA; and Manistique, MI.

Special Focus Area: Lake St. Clair

The recent EPA sponsored Lake St. Clair conference held in December 1999, highlighted environmental concerns present in this important binational waterway, including sediment contamination, non-point source pollution, sewer overflows, fish advisories, and impacts from invasive species. Despite these problems, the lake is also recognized as an ecologically rich area through the State of the Lakes Ecosystem Conference (SOLEC) process. Efforts are now underway to address these issues, as well as document historical conditions and existing high-quality habitat. The Great Lakes Program has identified Lake St. Clair as a special focus area and will provide assistance to ongoing efforts to protect the watershed.

Key Actions/Objectives:

- By 200X, support the development of a locally-driven, binational program to manage Lake St. Clair, including habitat assessment, monitoring coordination, and periodic “state of the lake” report and conference.
- Support the development of a larger advisory forum from the binational community.

Reporting on Environmental Indicators-Data and Trends

As part of the Great Lakes ecosystem, humans have had an undeniable impact on health of all ecosystem components. To gain understanding of the status and trends of the health of the Great Lakes and its ecosystem components, we have developed a set of indicators. No one organization has the resources, expertise, or the mandate to examine the “state of the lakes”. However, dozens of organizations and thousands of individuals routinely collect data, analyze them, and report on parts of the health of the ecosystem.

Due to the size of the Great Lakes and the number of collecting and reporting jurisdictions, a consensus by environmental management and natural resource agencies and other interested stakeholders regarding what information is necessary and sufficient to characterize the state of the Great Lakes Ecosystem is a way to facilitate more efficient monitoring and reporting programs. The relative strengths of the Agencies will be utilized to improve the timeliness and quality of data collection, avoid overlap, and make the information available to multiple users as well as the public.

The dialog developed as part of the biannual State of the Lakes Ecosystem Conference (SOLEC) has been an appropriate launching point for addressing and agreeing on indicator development, information gathering, and reporting. The SOLEC process, which is binational, has identified over 80 indicators to date that will provide information on all components of the Great Lakes ecosystem. These indicators will provide information to the public, to the Lakewide Management Plan (LaMP) committees, and for a wide spectrum of other Federal, State and Tribal Agencies to gauge the health of the lakes. Trends and status will be coordinated with the Government Performance and Reports Act requirement to insure fully coordinated reporting processes and procedures. In addition, a Lake Michigan Monitoring Council has been formed which will assist in ensuring monitoring resources and information are shared, coordinated, and support indicators that have been agreed to. This effort will serve as a model for other Lakes.

Key Actions/Objectives:

- Continue supporting SOLEC indicator process, through a network of Federal, State and non-governmental groups, including reporting out on indicators and ensuring the process is fully coordinated at the lake and local levels, to accurately assess ecosystem health.
- Support the establishment and operation of Lake-specific monitoring committees, designed to coordinate monitoring, data gathering and data quality activities by multiple Agencies and organizations.
- By (year), the SOLEC, LaMP, and RAP processes will provide clear and integrated information on Great Lakes water quality measures, trends, and actions (e.g., water quality trends, fish tissue trends, beach closures, RAP and LaMP implementation, ecosystem restored) and will be accessible to the public via the Internet and will be updated on a regular basis.

Establishing Research Priorities for the Great Lakes

The complex challenges of the Great Lakes community require reliable facts about the health of the environment and human well-being as well as new and consistent technology for identifying causes of environmental problems and sustaining desired beneficial uses for these unique natural resources. To achieve the needed scientific basis to help solve these Great Lakes challenges requires a strong, well-focused research program. The Great Lakes community is fortunate to have numerous Federal, Tribal, State, Provincial, and University research organizations that are poised to fulfill these scientific needs.

At its January 2001 meeting, the International Joint Commission's Council of Great Lakes Research Managers (CGLRM) committed to produce a binational research strategy to accompany its annual Great Lakes Research Inventory, pending the approval of the Commissioners. This strategy will identify the scientific knowledge gaps, and associated research objectives, that limit the ability of Great Lakes managers to meet specific goals of the Great Lakes Water Quality Agreement. Upon its completion, the strategy will be used by Federal, Tribal, State, Provincial and academic institutions, and funding organizations, to create a unified program that draws upon, and synergizes, the unique talents and missions of the Great Lakes research organizations.

Most agencies have strategies and implementation plans that address their mission-orientated research priorities. For example, the USEPA Office of Research and Development, in partnership with the Agency's Program and Regional Offices, has established Clean Water and Sound Science research strategies that address national needs to advance monitoring designs for assessing ecological condition of aquatic resources, develop techniques to identify causes of impairments, establish nutrient, habitat and toxics criteria, and forecast future condition to support risk-based remediation and restoration options. Consistent with development and implementation of these strategies, USEPA's research effort in the Great Lakes basin parallels the national effort. For example, the USEPA Mid-Continent Ecology Division in Duluth, MN, which is responsible for coordinating and undertaking ORD's assessment and effects-based research in the Great Lakes basin, meets semi-annually with the Great Lakes National Program Office to facilitate integration of the basin-specific efforts within the national strategies.

To implement a synergistic multi-Federal, Provincial, State, Tribal and academic Great Lakes research strategy, interagency research coordination will be accomplished binationally on a continual basis, through professional conferences, agency workshops, and related venues that address specific key research areas. Through ongoing efforts at multiple scales, addressing high priority research needs, the scientific community in the Great Lakes will assist decision makers in solving pressing environmental problems in the basin.

Ensuring U. S. Coordination and Cooperation

The U.S. Policy Committee was reestablished and reinvigorated in 1999, and has spearhead the development and implementation of this strategy. This Committee is comprised of representatives of state, tribal, and federal agencies. The Committee will set overall priorities and will coordinate the development of individual actions and commitments by agencies that will contribute to the achievement of the goals, objectives and actions included in this plan.

Each year the USPC will review the joint progress against priorities set, ensure collective accountability, and recommend adjustments in Agency actions to facilitate the accomplishment of this plan, as well as other important plans and initiatives, such as LaMPs and RAPS. In addition, the USPC will promote international, interagency, and cross-program coordination for the Great Lakes and ensure that the necessary communication and decision making is occurring on a timely basis to ensure progress and

overall accountability for these joint priorities. The USPC will also be the key forum in developing coordinated U.S. positions on Great Lakes environmental policy issues that will be coordinated with our Canadian partners.

Fostering Binational Coordination and Cooperation

The Binational Executive Committee (BEC) is the primary policy mechanism at the basin scale to promote coordinated binational programs and actions. The BEC derives its mandate from the provisions of the Great Lakes Water Quality Agreement (GLWQA) which relate broadly to notification, consultation, coordination, and joint activity. In particular, Article X specifies the commitments of the Parties to consultation and review, and includes the following requirement: *The Parties, in cooperation with State and Provincial Governments, shall meet twice a year to coordinate their respective work plans with regard to the implementation of this Agreement and to evaluate progress made.*

The BEC is composed of senior-level representatives of Canadian and U.S. federal, state, and provincial agencies who are accountable for delivering major programs and activities that respond to the terms of the GLWQA. The BEC typically meets twice a year or as required to:

- Set priorities and strategic direction for binational programming in the basin;
- Coordinate binational programs and activities;
- Respond to new and emerging issues on the Great Lakes including tasking existing or creating new working groups to undertake designated activities; and
- Evaluate progress and assure accountability for achieving commitments under the GLWQA.

Public Involvement

Public involvement is an important aspect to the successful management of the Great Lakes. The partners of this strategy recognize our trust responsibilities to the public and commit to seeking meaningful public involvement in our decision making process. Major venues for public involvement include LaMP and RAP forums, as well as the biennial listening sessions at the International Joint Commissions Water Quality Forum.

We also recognize the great deal of technical expertise that lies in environmental organizations, public groups, educational institutions, and industry. The partners to this strategy will actively seek technical comment on major activities through existing forums, as well as focused periods of public comment and listening sessions.

Key Actions/Objectives:

- Support public involvement in Great Lakes Programs by supporting AOC and LaMP Public Advisory Councils and Forums.

Communicating Progress

The partners to the Strategy will work together to provide periodic updates and progress reports to the public, and other entities that have an interest or role in Great Lakes environmental protection. The primary vehicle for this will be periodic reports such as the overall Report on the Great Lakes Ecosystem, required by section 118 of the Clean Water Act, as well as State and other Agency reports. Other important vehicles for reporting are the binational State of the Lakes Conference and periodic updates and reports from the LaMP and RAP process. A comprehensive progress report will be provided to the

International Joint Commission biannually as required by the GLWQA. The partners to this strategy commit to placing reports and information on the internet on a timely basis so information can reach a wide audience.

Emerging Problems and Continuing Challenges

The environmental protection and natural resource management problems of the Great Lakes Basin are a great challenge. As our knowledge of the ecosystem progresses, we can expect newly identified problems to emerge. This strategy is not a static work plan, but rather reflects our ongoing commitment to the long-term protection and restoration of the Great Lakes.

The people of the Great Lakes Ecosystem will know that we have successfully solved these problems when all Great Lakes beaches are safe and open for swimming, the fish are safe to eat, safe drinking water is maintained and enhanced, and the Great Lakes basin is a healthy natural environment for wildlife and people.

CONCLUSION

To meet the environmental challenges facing the Great Lakes, this multi-Agency strategy charts the course of environmental protection and ecosystem management in the Basin for the next five years. For each of our goal areas, we have outlined specific strategies and programs through which the States, Tribes, and Federal Agencies will work. This strategy demonstrates that we have entered a new era, with a recommitment to renewing our partnership, and that we will pursue cooperative environmental actions to clean up and to protect the Great Lakes. Appendix 5 outlines roles and responsibilities of key Agencies in this partnership.

We are focusing on ecosystem management and environmental protection; we have identified a full array of specific initiatives and programs we are implementing to improve the Great Lakes ecosystem; we are continuing our tradition of building coordination among partners that have shared interests and we are involving citizens and stakeholders in these actions as full participants, even taking the lead in many areas. The States, Tribal, and Federal partners recognize the challenge of this effort, but believe that such an approach is essential to achieving success. We recognize that the world's largest freshwater system, including the vulnerable living resources that rely on it, merit the highest level of our efforts and attention.

Adopted by consensus on _____.

Chair, U.S. Policy Committee

Appendix 1

Beneficial Use Impairments

ELIMINATION OF IMPAIRMENTS OF BENEFICIAL USES TO THE GREAT LAKES

The Great Lakes shall be free of the following as a result of human activities in the basin:

- Restrictions on its fish and wildlife consumption
- Tainting of fish and wildlife flavor
- Degradation of its fish and wildlife populations
- Fish tumor or other deformities
- Bird, animal, or other biota deformities or reproduction problems
- Degradation of benthos
- Restrictions on dredging activities
- Cultural eutrophication or undesirable algae
- Restrictions on drinking water consumption, or taste and odor problems
- Beach closings
- Degradation of aesthetics
- Added costs to agriculture or industry
- Degradation of phytoplankton and zooplankton populations
- Loss of fish and wildlife habitat

FROM THE GREAT LAKES WATER QUALITY AGREEMENT, ANNEX 2

Desired Outcomes

DESIRED OUTCOMES FOR THE GREAT LAKES ECOSYSTEM

Fishability - There shall be no restrictions on the human consumption of fish in the waters of the Great Lakes basin ecosystem as a result of anthropogenic (human) inputs of persistent toxics.

Swimmability - No public bathing beaches closed as a result of human activities, or conversely, all beaches are open and available for public swimming.

Drinkability - Treated drinking water is safe for human consumption; human activities do not result in application of consumption restrictions.

Healthy Human Populations - Human populations in the Great Lakes are healthy and free from acute illness associated with locally high levels of contaminants, or chronic illness associated with long-term exposure to low levels of contaminants.

Economic Viability - A regional economy that is viable, sustainable, and provides adequate sustenance and dignity for the human population of the Great Lakes.

Biological Community and Integrity - Maintenance of the diversity of biological communities, species, and genetic variations within a species.

Virtual Elimination of Inputs of Persistent Toxic Substances - Virtual Elimination of inputs of persistent toxic substances to the Great Lakes system.

Absence of Excess Phosphorus - Absence of excess phosphorus entering the water as a result of human activity.

Physical Environmental Integrity - Land development and use compatible with maintaining aquatic habitat of a quantity and quality necessary and sufficient to sustain an endemic assemblage of fish and wildlife populations.

Water Quantity – There will be no diversion of Great Lakes waters that adversely affects any aspect of the basin.

THE INTERNATIONAL JOINT COMMISSION'S INDICATORS TO EVALUATE PROGRESS UNDER THE GREAT LAKES WATER QUALITY AGREEMENT

Note: The desired outcomes have been developed by an IJC indicator task force and are provided here for reference. For more information see: <<http://www.ijc.org/boards/ietf/ietf.html>>

Appendix 3

Great Lakes Binational Toxic Strategy (GLBTS) Goals and Challenges

BINATIONAL TOXIC STRATEGY (GLBTS) GOALS AND CHALLENGES

FOR THE UNITED STATES

-Confirm by 1998, that there is no longer use, generation or release from sources that enter the Great Lakes Basin, of five bioaccumulative pesticides (chlordane, aldrin, dieldrin, DDT, mirex, and toxaphene), and of the industrial by-product octachlorostyrene. If ongoing, long range sources of these substances from outside of the United States and Canada are confirmed, work within existing international framework to reduce or phase out releases of the substances.

-Confirm by 1998, that there is no longer use of alkyl-lead in automotive gasoline; reduce or replace by 2005, alkyl lead in aviation fuel.

-Seek by 2006, a 90 percent reduction nationally of high level PCBs (>500ppm) used in electrical equipment.

-Seek by 2006, a 50 percent reduction nationally in the deliberate use and 50 percent reduction nationally in the release of mercury from sources resulting from human activity.

-Seek by 2006, a 75 percent reduction nationally in total releases of dioxins and furans from sources resulting from human activity. Seek by 2005, reductions nationally in releases of hexachlorobenzene, B(a)P, and dioxins, from sources resulting from human activity that enter the Great Lakes basin.

-Promote prevention and reduced releases of Level 11 substances. Increase knowledge on sources and environmental levels of these chemicals.

-Assess atmospheric inputs of persistent toxic substances. The aim of this effort is to jointly evaluate and report on impact of long range transport of persistent toxic substances from world sources by 1998. If ongoing long-range sources are confirmed, work within existing international framework to reduce releases of such substances.

-Complete or be well advanced in remediation of priority sites with contaminated bottom sediments, in the Great Lakes basin by 2006.

Binational Toxic Strategy of 1997

<<http://www.epa.gov/glnpo/p2/bns.html>>

Appendix 4

Role of Partners and Agencies in the Great Lakes Basin

A number of other Federal, State and Tribal Agencies and jurisdictions have important and essential roles to play in Great Lakes clean up and protection and are partners to this strategy and have significant authorities and resources that will be coordinated effectively to assist in accomplishing this strategy. Following is a brief description of their roles and responsibilities with respect to Great Lakes clean up and protection.

The U.S. Environmental Protection Agency-Great Lakes National Program Office

Great Lakes National Program Office (GLNPO) will further the systematic and comprehensive approach to ecosystem management of the Great Lakes, as required by the Great Lakes Water Quality Agreement, by working with the Canadians and with other Federal and State agencies to ensure that compatible and consistent approaches to environmental protection occur across the basin.

GLNPO will continue to provide leadership in updating and implementing this Strategy and will report overall progress, trends in environmental conditions, as well as specific accomplishments, in a timely manner to Congress and the public. In particular, GLNPO will provide valuable assistance to the Regions and States in the implementation of the Great Lakes Program, and will seek to fulfill its specific mission as set forth in s. 118 of the Clean Water Act. USEPA Headquarters, particularly the Office of Water and the Office of International Activities will continue to set overall national policy regarding EPA's program and implementation of environmental statutes. Regions 2, 3, and 5 have important implementation roles for carrying out Great Lakes programs and will continue this work to ensure mandates are fulfilled and goals are met.

Role of the Great Lakes States and Local Partners

Each of the eight Great Lakes States has environmental and natural resource agencies or divisions. These agencies have primary responsibility in implementing key pollution control programs. In addition, they have developed many unique programs to meet the needs of the Great Lakes and have been leaders, individually and as a group, in addressing major environmental issues, and have primacy in managing fisheries and other natural resource issues.

Role of Great Lakes Tribes and Tribal Organizations

The Great Lakes Tribal Governments (over 30 U.S. tribes) have important roles to play in ecosystem protection for the Great Lakes and will implement activities as part of the Tribal Environmental Agreements. In addition, many tribes have participated in the development of this strategy, and will assist in its implementation. In addition, the Chippewa/Ottawa Treaty Fishery Management Authority and the Great Lakes Indian Fish and Wildlife Commission have been invited to participate in implementing the Strategy. Activities within their jurisdictions will be identified and implemented as part of the Strategy.

Role of Federal Agencies

The **U.S. Environmental Protection Agency (USEPA)** is responsible for the nation's regulatory programs for air, water, pesticides, and toxic chemicals. EPA also sets national direction in environmental policy.

The **U.S. Fish and Wildlife Service (FWS)** serves as trustee to protect the interests of endangered species, migratory birds, and interjurisdictional fishery resources such as the lake trout and lake sturgeon, and supports the States and other federal agencies with population and habitat inventories. FWS also manages 140,000 acres of federal land holdings in the form of Fish and Wildlife Refuges in this region and performs resource assessment and research. They are also responsible for Natural Resource Damage Assessments (NRDAs) to recover damages for injuries caused to natural resources (e.g., endangered species, migratory birds, and trust fisheries) by the release of hazardous substances.

Three agencies of the **U.S. Department of Agriculture (USDA)** assist landowners with pollution prevention and control of non-point discharges from agricultural operations: the **Natural Resources Conservation Service (NRCS)**, the **Cooperative State Research, Education, and Extension Service (CREES)**, and the **Farm Services Agency (FSA)**. NRCS provides national leadership in the conservation and wise use of soil, water, plant, animal, and related resources; it works directly with agricultural producers on pollution prevention and control of non-point source discharges from agricultural operations. It also has an urban conservation program that provides technical assistance on non-point sources such as construction site runoff, fertilizer and pesticide inputs from lawns and other grassed areas, septic systems, flood control basins, and sediment storage ponds.

The **U.S. Coast Guard (USCG)** regulates pollution from ships, as well as the ship borne introduction of exotic species. Under the Oil Pollution Act of 1990, the Coast Guard has the lead responsibility for responding to oil spills in the Great Lakes. The USCG also works with USEPA to establish and implement area and regional Joint Contingency Plans for spills of oil and hazardous substances in the Great Lakes.

The **U.S. Army Corps of Engineers (Corps)** has responsibility for a civil works program under which it develops, maintains, and conserves the Nation's water and related land resources. It administers permit programs related to navigation and changes to the waters of the United States. The Corps plays a critical role in operating and maintaining the navigable waterways of the Great Lakes.

The **U.S. Forest Service (USES)**, and the **National Park Service (N.S.)** both play important roles as stewards of vast, and often unique, federal land holdings. State and private forestry programs, a cooperative effort of the USES and state forestry agencies assist public and private landowners in managing and protecting forest resources.

The **National Oceanographic and Atmospheric Administration (NAA)** provides research capabilities for monitoring environmental change. It supports an estuaries research facility on Lake Erie at Old Woman Creek (Huron, Ohio). Under the National Marine Sanctuary Act, NAA designates nationally significant areas of the marine environment as national marine sanctuaries to protect and manage distinctive conservation, recreational, ecological, historical, research, educational, or aesthetic values. NAA is also a leader in public information and education through its SEA Grant extension program.

The **U.S. Geological Survey (USES)** is responsible for monitoring tributary flow and water quality in surface and groundwater.

Role of Canadian Partners

Four of the five Lakes (all but Lake Michigan) are shared with Canada. Coordination with Canada involves federal agencies, as well as provincial agency counterparts in Quebec and Ontario. The binational International Joint Commission is charged with advising the national governments on issues of concern regarding joint stewardship of the Lakes. The U.S. Department of State assists all U.S. federal agencies as

they address Great Lakes issues of concern to both countries. EPA has lead agency responsibility for coordinating activities relative to the Great Lakes Water Quality Agreement with Canada (as amended by Protocol signed November 18, 1987). The Great Lakes National Program Office informs the Canada-Ontario Agreement (CWA) Board and the Great Lakes Committee of the Whole (Come) about matters related to water quality and fishery resources.